Understanding MMR Vaccine Safety

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- CDC recommends two doses of the measles, mumps, and rubella vaccine—MMR vaccine—for children because it protects them against dangerous, even deadly, diseases.
- The MMR vaccine has a long record of safety. Serious risks of MMR vaccine are rare. All reputable scientific studies have found no relationship between MMR vaccine and autism.
- The routinely recommended age for the first MMR dose is 12 through 15 months. The routinely recommended age for the second MMR dose is 4 through 6 years.
- If there is an outbreak of one of the diseases, health authorities might recommend the vaccine be given earlier.

| questions and answers |

All reputable scientific studies have found no link between MMR vaccine and autism. So, why do some people think that MMR vaccine causes autism?

There are a couple of reasons for this. Some parents of children with autism say they first noticed signs of autism a few days, weeks, or months after their child received MMR vaccine. They usually explain that their child was developing normally, and then signs of autism appeared after MMR vaccination.

Sometimes, signs of autism do not appear until around the age that the first dose of MMR is given. Some toddlers who've turned one year old—or even two or three years old—regress. That is, they lose the ability to do things that they once were able to do. If regression follows a memorable event like a trip to the doctor for vaccinations, this may seem like cause and effect.

There may be signs of autism before a child is old enough to get the first dose of MMR, at age 12 through 15 months. Parents and healthcare providers should work together and meet immediately if either has any concerns about a child's development. One of a doctor's responsibilities is to monitor a child's development for any signs of problems that can be prevented or treated. Healthcare providers and parents should partner to learn the signs of normal development and to act early if they suspect there may be a problem. For more information, visit *www.cdc.gov/ncbddd/autism/ActEarly/default.htm*.

A second reason that some people think MMR vaccine may cause autism stems from a 1998 study in the United Kingdom. It claimed that MMR vaccine could contribute to the development of autism. This study received a great deal of media coverage. At the time of the study, MMR vaccine had been in use for only 10 years in the U.K. During that period, the diagnosis of autism increased and parents, doctors, and scientists alike wanted to know the reason why. Since 1998, 10 of the 13 authors have withdrawn their support of the study. This study was followed rapidly by many larger population studies totaling thousands of children that found that MMR vaccine is not responsible for a rise in autism. Most recently, in 2008, a study from Columbia University did not repeat the findings of the U.K. study. The 2008 study showed no connection between MMR vaccine and autism.

What's the harm in delaying the first MMR shot until my child is age two or older?

The MMR vaccine is recommended to be given during ages 12 through 15 months. If you wait to give it later, your child could get measles, mumps, and/or rubella. All of these diseases are still out there. For example, in 2008, there were 140 measles cases in the U.S., more than any year since 1996. Seventeen were children under 12 months old—too young to be vaccinated according to the routine recommendation. Another nine were in unvaccinated 12- through 15-month-olds; this is the age when the vaccine is recommended. And 72 cases were in children and teens 16 months old through 19 years old who had not received the vaccine. Seventeen people, including six children younger than 15 months old, had hospital stays for complications from measles. Following U.S. recommendations for using MMR vaccine is the best way to protect children from these diseases and avoid outbreaks.

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How effective is MMR vaccine?

The vaccine is *so* effective that the U.S. eliminated measles in 2000. That is, enough people in the U.S. got two doses of MMR vaccine that the disease stopped spreading here. But, measles is still common in other parts of the world. Since people from the U.S. and other countries travel internationally frequently, we must keep U.S. MMR vaccination rates high. Even if your family does not travel, you could come into contact with international travelers anywhere in your community, from the grocery store to a sporting event. The United Kingdom had eliminated measles, but then MMR vaccination rates fell. Now, measles is once again spreading in that country.

Some people think that the vaccine preservative thimerosal is dangerous. Is there thimerosal or mercury in MMR vaccine?

No. The MMR vaccine never has contained thimerosal or any other form of mercury. Furthermore, there is no evidence that thimerosal in vaccines is harmful.

How long has MMR vaccine been in use?

The measles vaccine in MMR vaccine that we use today has been in use since 1968, the mumps vaccine since 1967, and the rubella vaccine since 1979. All of these vaccines replaced earlier versions. Today's versions are safer, provide longer lasting protection, and have fewer side effects.

What are the known side effects of MMR vaccine?

Mild problems include fever (about one person out of six); mild rash (about one person out of 20); and swelling of the glands in the cheeks or neck (rare.) Moderate problems include seizure caused by fever (about one out of 3,000 doses); and temporary low platelet count, which rarely can cause a bleeding disorder (about one out of 30,000 doses.) Severe problems are rare. Severe allergic reaction happens less than one time per million vaccine doses.

What are the causes of autism?

CDC and other agencies and organizations are conducting research to find out. Many doctors believe that genetics likely play a strong role.

Across the world, parents, doctors, and scientists are working together to find the causes of autism and the best ways to treat or prevent the symptoms. More information can be found at *www.cdc.gov/ncbddd/autism/*.

For more information on vaccines, call 800-CDC-INFO (800-232-4636) or visit *www.cdc.gov/vaccines*

| the science |

Here is a summary of five of the more than 20 reputable studies that have found *no relationship* between MMR vaccine and autism. These studies were selected for this sheet because they illustrate the variety of methods that have been used to investigate whether MMR vaccine is linked to autism.

Lack of Association between Measles Virus Vaccine and Autism with Enteropathy: A Case-Control Study by Mady Hornig et al. *PLoS ONE.* September 2008. Vol 3: page e3140.
This study was conducted in 2004-2008 to determine whether results from an earlier study that claimed to find measles virus RNA in the intestinal tissue of a specific group of autistic children could be confirmed. They could not, and no link between MMR vaccine and autism was found. ***http://www.plosone.org/article/info:doi/10.1371/journal.pone.0003140.***

Age at First Measles-Mumps-Rubella Vaccination in Children with Autism and School-Matched Control Subjects: A Population-Based Study in Metropolitan Atlanta by Frank DeStefano et al. *Pediatrics.* February 2004. Vol 113: pages 259–266.
This study looked at 624 children who had autism and 1,824 children who did not. These children were ages three to ten in 1996, and lived in Atlanta, GA. There was no difference in MMR vaccination rates by age 18 months or age 24 months. The study concluded that getting MMR vaccine before age two is not a cause of autism. ***http://pediatrics.aappublications.org/cgi/reprint/113/2/259.***

Immunization Safety Review: Vaccines and Autism. *Institute of Medicine.* The National Academies Press: 2004.
In 2000, CDC and the National Institutes of Health (NIH) asked the Institute of Medicine (IOM) to put together an independent expert committee to review evidence about whether vaccines cause certain health problems. One thing the committee studied was whether or not MMR vaccine causes autism. The committee issued a report in 2004; it says they found no evidence that MMR vaccine causes autism. ***http://www.iom.edu/?id=20155&redirect=0.***

A Population-Based Study of Measles, Mumps and Rubella Vaccination and Autism by Kreesten Meldgaard Madsen et al. *New England Journal of Medicine.* November 7, 2002. Vol 347: pages 1477–1482.
This study looked at *all* children born in Denmark during 1991 through 1998—more than 530,000 children. Of these, 82 percent had received MMR vaccine. There was no difference in the rate of autism in children who received MMR vaccine and those who did not. Among the vaccinated children, there was no association between the age when vaccinated with MMR or the time since vaccination and the development of an autistic disorder. ***http://content.nejm.org/cgi/reprint/347/19/1477.pdf.***

Autism and Measles, Mumps, and Rubella Vaccine: No Epidemiological Evidence for a Causal Association by Brent Taylor et al.
The Lancet. June 12, 1999. Vol 353: pages 2026-2029.
This study in eight health districts of the United Kingdom looked at 498 children with autism born since 1979. Autism increased steadily, with no increase in the rate when MMR vaccine was introduced in 1988. In children who got MMR vaccine, there was no relationship between the timing of MMR vaccination and the onset of autism. ***http://www.freenetpages.co.uk/hp/gingernut/lancet/Brent%20Taylor%20June%201999.pdf.***